

WE CLAIM:

1. A fire protection sprinkler system for metal buildings comprising:
  - a plurality of parallel rafters supporting a roof of a metal building and spaced to form a plurality of bays up to about 28 feet wide;
  - at least one water line extending along and supported by each of the rafters; and
  - a plurality of sprinkler heads adjacent to and supported by the rafters and connected to receive water from the supply lines and having deflectors arranged to distribute water over the area of the bays between the rafters.
2. A sprinkler system according to claim 1 wherein the sprinkler heads are oriented with their axes extending in a horizontal direction with outlet orifices directed toward the bays adjacent to the rafters.
3. A sprinkler system according to claim 1 wherein each rafter has a supply line to which sprinklers are connected extending along each side of the rafter.
4. A sprinkler system according to claim 1 wherein each sprinkler has a K factor in a range from about 11 to about 25.
5. A sprinkler system according to claim 4 wherein each sprinkler has a K factor of at least about 14.

6. A sprinkler system according to claim 1 wherein the sprinklers provide a coverage density of at least about 0.2 gallons per minute per square foot of the area in the bays between the rafter.

7. A sprinkler system according to claim 1 wherein each sprinkler includes a deflector having a vertical part facing the sprinkler orifice and a hood part having a generally horizontal roof portion and downwardly inclined wall portions on opposite sides of the roof portion and at the forward end of the roof portion located on the opposite side of the vertical part with respect to the sprinkler orifice.

8. A sprinkler system according to claim 7 wherein the vertical part has an opening above the axis of the sprinkler and includes a central projection extending upwardly into the opening.

9. A sprinkler system according to claim 7 wherein the hood part includes a rear wall portion extending downwardly from the rear of the roof portion and having a surface facing the sprinkler orifice.

10. A horizontal sprinkler head for use in fire protection sprinkler systems for metal buildings comprising:

    a sprinkler body adapted to be connected to a water supply line and having a passage with an orifice;

    a deflector arrangement supported from the sprinkler body in horizontally spaced relation to the orifice;

    the deflector arrangement including a vertical part disposed in line with

the sprinkler orifice and a hood-shaped part located above and supported from the vertical part;

the hood-shaped part including a horizontal roof portion, two side wall portions extending downwardly from opposite sides of the roof portion at angles to the vertical, and a front wall portion extending downwardly from the front of the roof portion at an angle to the vertical; and

the vertical part including a lower portion inclined at an angle to the vertical in the direction away from the sprinkler orifice, a horizontally extending opening above the sprinkler axis between spaced arm portions supporting the hood-shaped part, and a vertical projection extending upwardly into the horizontally extending opening.

11. A sprinkler arrangement according to claim 10 wherein the side wall portions extend at an angle to the vertical in a range from about 15° to 35°.

12. A sprinkler arrangement according to claim 11 wherein the side wall portions extend at an angle to the vertical of about 25°.

13. A sprinkler arrangement according to claim 10 wherein the front wall portion extends at an angle to the vertical in a range from about 40° to 60°.

14. A sprinkler arrangement according to claim 13 wherein the front wall portion extends at an angle to the vertical of about 42°.

15. A sprinkler arrangement according to claim 10 wherein the lower portion of the vertical part extends at an angle to the vertical in a range from about 20° to about 40°.

16. A sprinkler arrangement according to claim 15 wherein the lower portion of the vertical part extends at an angle to the vertical of about 30°.

17. A sprinkler arrangement according to claim 10 wherein the hood-shaped part includes a rear wall portion extending downwardly from the rear of the roof portion and having surface facing the orifice.

18. A sprinkler arrangement according to claim 10 wherein the ends of the side walls of the hood-shaped part facing the sprinkler orifice have inward projections with forwardly inclined lower portions.

19. A sprinkler arrangement according to claim 18 wherein the lower portions of the inward projections are inclined away from the orifice at an angle to the vertical in a range from about 20° to about 45°.

20. A sprinkler arrangement according to claim 19 wherein the lower portion of the inward projections are inclined away from the orifice at an angle to the vertical of about 22°.

21. A sprinkler arrangement according to claim 10 wherein the deflector arrangement includes a further part mounted on the side of the vertical part facing the orifice and having arms extending horizontally, arms extending downwardly and arms extending at an angle between the horizontal arms and the arms extending downwardly, each of the arms being inclined at an angle to the vertical toward the orifice.

22. A sprinkler arrangement according to claim 22 wherein the arms extend at an angle to the vertical in a range from about 10° to about 30°.

23. A sprinkler arrangement according to claim 22 wherein the arms extend at an angle to the vertical of about 20°.

24. A sprinkler arrangement according to claim 10 including a pair of deflector support arms extending from the sprinkler body and joined on the sprinkler axis at a boss supporting the vertical part of the deflector arrangement.

25. A sprinkler arrangement according to claim 10 having a K factor in a range from about 11 to about 25.

26. A sprinkler arrangement according to claim 25 having a K factor of at least about 14.